

Magical Bits: Designing Through Experiencing the Future End Product

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ABSTRACT

This paper describes a method for designers to brainstorm around, and to experience, an end product before it is even conceptualized. Magical Bits are simple physical models representing the main property of a technology or a main function of a future end product. Knowing the end product's main function, and using these models as if they were working products, can help to put the experience in focus. By stepping away from the computer, technical limitations and "single solution thinking", the aim of this method is to let a designer develop through experiencing the users' perceptions and emotions, which should have a central role in the beginning of a design process.

Author Keywords

Design tool, idea generation, participatory design, Magical Bits.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design, experimentation.

INTRODUCTION

A product is, among other things, representing the designer's perception of people, possible users and possible use. This can of course limit the experience of the end product, especially if the product is outside the designer's actual interest and use. We need to find a way to experience what we are designing for [3] and to emphasize this in the beginning of the design process.

Also, sometimes when we design in HCI, we find ourselves trapped in the computer box or in technical limitations, and have a hard time focusing on the main function of the product. When we are distracted by all these other

impressions, it is hard to focus on the perceptions and feelings that we want to create, mediate or bring the user through the product.

Disregarding whether the approach is technology-driven or user-centric, what we usually have in the beginning of a design process, or before we have even started, is the main function of our future end product. This function can for example be based on a user need or a new technology; either we know what function we want to accomplish through the product or we know the function/property of the technology provided for the product.

A difficulty when focusing on the main function in the beginning of a design process is to avoid solution-oriented thinking. At this stage all idea generation should be as open as possible and should be avoiding every thought of a possible solution. By defining a technical solution too early in a user-centric product development, one risks to miss out on solutions that would require different technology and automatically narrow the innovative thinking by the limits of a specific technology. By being experts on the technology in a technology-driven product development, one might have difficulties with finding inspiration in a too familiar environment. In this case one needs something that lifts one out of the ingrained thinking pattern to look at the technology from a distance and focus on the relevant property and its possibilities.

Summary: it is hard to talk about function without thinking about the 'How?'.

When focusing on a main function as words, the mind can spin off and start to analyse the meaning of the words. If putting the words into a simple model that represents the function, we believe that the focus can be moved from the function and more towards the actual use.

*Words put focus on function.
Actions put focus on use.*

RELATED METHODS

Cross-functional product development [9] and participatory design [11]; anyone somehow involved in the product should be integrated from the beginning of the process. Marketing, R&D, design, construction, production, stakeholders, users; if everyone is involved from the

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beginning, possible issues can be highlighted and prevented before changes are more expensive. In a product development chain, the cost of change is increased exponentially with every step [4]. In the participatory design models, everyone and everything is included from the start, often without the most important thing: the actual product, its use and the perception of it. The experience of the product is a step that should be handled in the process before thinking about solutions.

Metaphors and analogy are widely used techniques for creative thinking and idea generation (e.g. [8], [10]). While some methods have involved the future end product by rapidly and iteratively mocking it up in cardboard (e.g. [2]), we believe that shapes should remain untouched till later and that the function alone should run this stage of the design process.

Functional Decomposition [6] is a commonly used design tool to elucidate a main function. When performing a functional decomposition one breaks down the product's desired functions into a verb and a noun. As an example, the most desired function of a vacuum cleaner is that it removes dirt, and "remove dirt" is then used as the function to focus on when generating ideas. A risk when brainstorming around how to achieve these functions is to add too much detail to the resulting questions, so that it puts too much focus on the technology [13].

MAGICAL BITS

Magical Bits is supposed to be a playful idea generation method, aiming to focus on the main function of a future end product. The function can either be based on a technology's property, to find new areas to apply it, or it can be based on a user need, to develop around the function. Either way, it is also a method for a designer to focus on the experience of the end product through a simple model that is representing the end product's main function.

In Magical Bits we are extracting the main function in the same way as when doing a functional decomposition. The function is then illustrated through a familiar and simple physical item, sharing the same function. Whereas the functional decomposition is asking *how* and *why* one should reach this function, the Magical Bits are asking *for what* one can create this function.

Technology	Feature	Example	Function	Magical Bit
Image recognition	Add information to places	Write things on views	Write	Magical Pen
Image recognition	See information at places	See things that are not there	See	Magical Glasses
RFID	Add information to things	Put invisible notes on things	Note	Magical Post-it

Table 1. Technologies and their significant Magical Bit.

Magical Bits can be used as one of the initial steps in a design process, of what some people would call a technology-driven design process or "grounded innovation" [7]. However, we believe this technology-driven design method also fits in under the user experience concept, making technology-driven design more user-centric.



Figure 1. Magical Glasses representing a property of image recognition. These glasses let the user see anything, anywhere, at any time.

The idea of Magical Bits arose from another project, a method called *Inspirational Bits* [12], where our goal was to create physical models that would inspire design possibilities through revealing a technology's properties. A problem with the Inspirational Bits is that they tend to be a bit too processed to keep the users' focus on the actual properties they are demonstrating and not on the systems. In this project we have eliminated the technology completely from the models, focusing only on the properties. In a design process, Magical Bits could work as a good step before Inspirational Bits, before getting into details. In this step, still on an idea generating level, the user and the experience is in focus.

In the most rewarding brainstorming or idea generation sessions people are not inhibited to express their irrational ideas and thoughts. However, sometimes technical limitations, or the lack of competence in the field, is interfering with our fantasy and liberalization. The Magical Bits help to distract from logic and preconceived meanings by being direct and simple. And magical. By intentionally making the Magical Bits look "magical", or even silly (figure 1), we believe that one can easier reach the state of mind, open and loose, that is ideal for brainstorming.

Example: Magical Pen & Magical Glasses

We started out with computer vision and image recognition for mobile applications. Two interesting design properties of this technology is that one can add virtual things and information to places that can only be seen through the display of the mobile phone. The main functions here is that

one can *add things and see things that do not exist*. A pen (figure 2) and a pair of glasses (figure 3) are simple tools that everyone is familiar with, which is why they make good models for this technology and functions.

MAGICAL BITS IN ACTION

If you put on these magical glasses you will be able to see anything, anywhere, at any time. Wherever you look there is the information or augmentation provided, specific for your interests. What would you use them for?

The Magical Bits method was tried out in a workshop with colleagues at the Mobile Life Centre. The aim of the workshop was to come up with new ideas of mobile applications based on different sensors in the phone. The main focus was on using the camera for applications for image recognition. The participants in the workshop had different backgrounds ranging from design, programming and social science.



Figure 2. Magical Pen that can write on anything. On air for example.

We started off with brainstorming around image recognition and how it can be used in mobile phones. Instead of introducing image recognition as a main focus to this group of people, where only a small part was familiar with the technology, we introduced the main function of the technology. In this case it was illustrated in the form of a pair of magical glasses. The participants were informed that these were a pair of magical glasses and with these on, one would be able to see whatever one could wish for in

different contexts. The method was combined with Random Words and the participants were asked to describe what they would use the glasses for, for example in the subway, in the grocery store or in the city space.



Figure 3. Magical Glasses in action.

DISCUSSION

The workshop was quite successful and we got a lot of new ideas to elaborate. We got the impression that the participants found it easier to let loose in the brainstorming session than what they had at earlier brainstorming occasions. The designers, with little technical knowledge in comparison, were not holding back because of insecurity about the technology. And the programmers seemed to be able to fantasize more freely, when not being reminded of technical limitations. It seemed like everyone had the chance to understand each other and work together, much like in a Design Collaboratorium [1].

We also found that the participants were living in the role of actually using these tools as real products, similar to Method Acting [5]. They were not only talking about the use and the function of the possible products, they were also able to describe their thoughts and emotions while using them.

By already having the ideally functioning end product illustrated with a Magical Bit, one is forced to accept that all technical issues are solved and instead focus on the usage and experience. When doing in-field user studies, the end user is followed around and observed while explaining how the Magical Bit is being used as a functional end product in its real environment. The designers also get to

experience the product together with the users. The Magical Bit has no flaws, no interrupting errors and no limitations and this allows the user to freely imagine its possibilities. Since these products are *magical*, and function just the way the users want them to function, without any technical interruptions, the users can focus on their needs and the designers can focus on the experienced perceptions and emotions.

CONCLUSION

In this paper, we have presented an idea generation method called Magical Bits. Magical Bits are simple physical models representing the main property of a technology or a main function of a future end product. By stepping away from the computer, technical limitations and “single solution thinking”, the aim of this method is to let a designer develop through experiencing the users’ perceptions and emotions, which should have a central role in the beginning of a design process.

The Magical Bits can be used in different ways. In a more user-centered product development, the function of the future end product is known and the Magical Bit will be used as a method to focus on the experience and the user’s perceptions and emotions with the product. It can also investigate possible sub functions. In a more technology-driven development, the models would concentrate more around what the technology’s property/function can be used for.

Based on the workshop outcomes, we argue that the Magical Bits serves a few good purposes in an idea generating session:

- Prevents brainstorming restraints due to different levels of knowledge in technology, in a design team.
 - Helps to prevent solution-oriented thinking.
 - Moves focus from the specific technology and its limitations to its main function and helps to look at the possibilities from a different and hopefully more inspiring perspective.
 - Enables to start brainstorming around a main function
 - Helps to focus on the perceptions and feelings that we want to create, mediate or bring the user through the product.
 - Can help to encourage technology-driven design through a user-centric approach.
- Helps to put focus on *use* rather than *function*.
 - To some extent, these models helps to design more *in practice* rather than *in theory*.

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